



Global scenarios and Nordic industries

Nordic Energy Futures, 17 March 2008

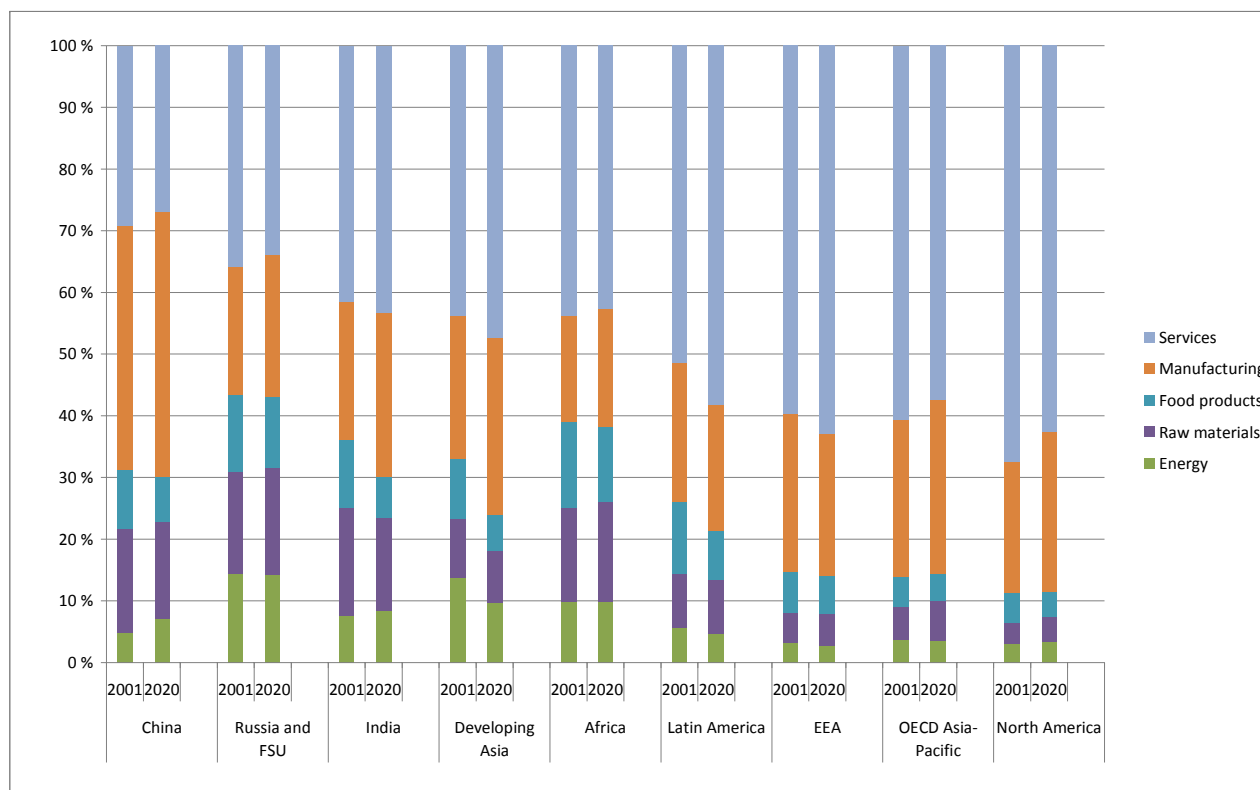
GOVERNMENT INSTITUTE FOR ECONOMIC RESEARCH (VATT)

Janne Niemi

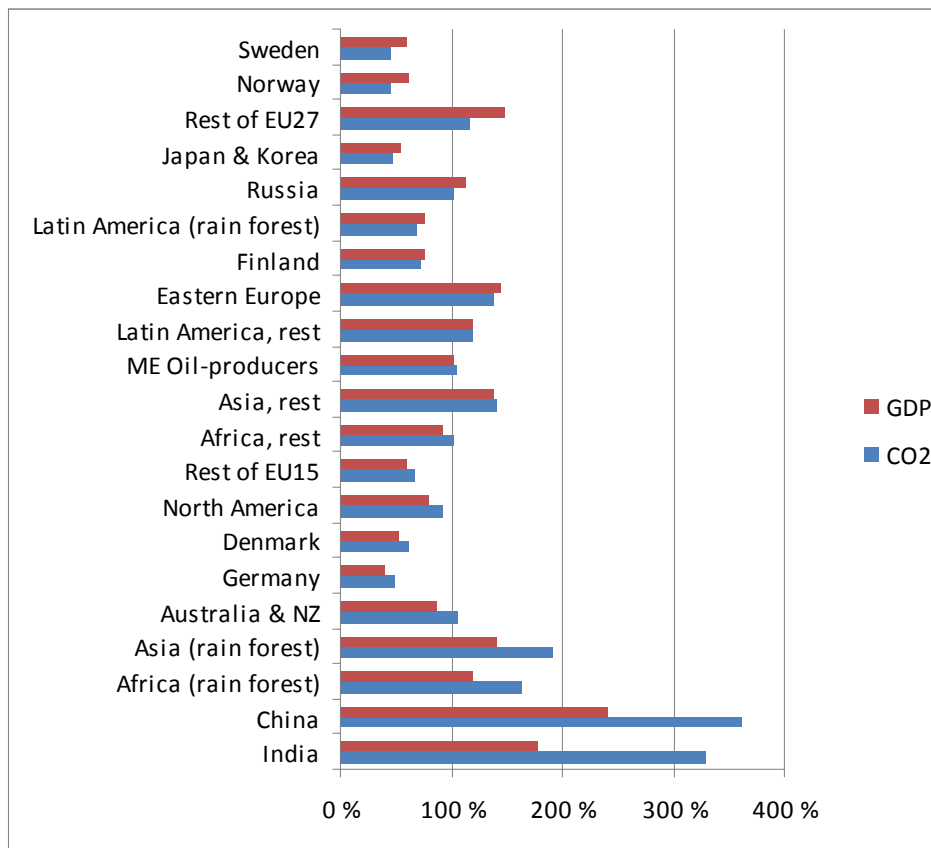
Simulations 2001-2020

- 2001-2020 *"No-policy"* run
 - Driven by GDP, population, skilled & unskilled labour growth
 - Improved data for Europe (migration, enlargement)
- 2001-2020 with Kyoto commitments *"Present commitments"*
 - Includes *ratified* and *non-redundant* Kyoto reductions
 - EU burden-sharing, emulates ETS I from 2005
- Past 2012 EU alone *"EU2020"*
 - Further reductions in line with EU 20-20-20
 - Emulates ETS II: inclusion of transport
 - No policy change in ROW
- Past 2012 All rich countries reduce *"All Rich"*
 - In EU, greater CO₂ reductions than in EU2020.
 - Other rich countries commit to Kyoto-like targets
 - Gradually starting 2013
 - Emissions trading within rich countries

Industry output shares World (no policy)



GDP and CO2 growth No-policy



- Rich countries: emissions grow slow compared to GDP
 - CO2 reduction expensive
 - Growth is "cleaner"

- Developing economies: emission growth much higher than GDP growth
 - CO2 reduction cost less
 - Growth is polluting

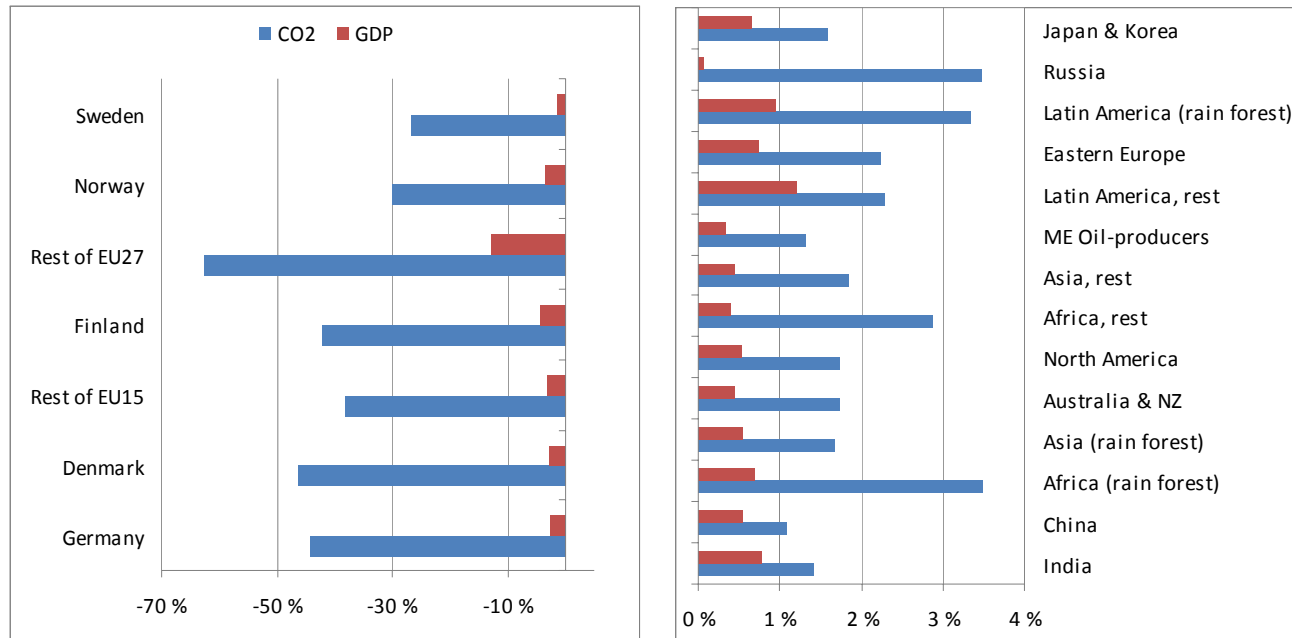
- Big differences also within country groups

Policy simulations and Nordic industries

- EU alone climate policies with present commitments and further reductions: qualitative results very similar, quantitative differences minor.
- "Carbon leakage": some emissions leak, but emissions increase compared to "no-policy" case minor – rest of the world emissions grow fast in any case.

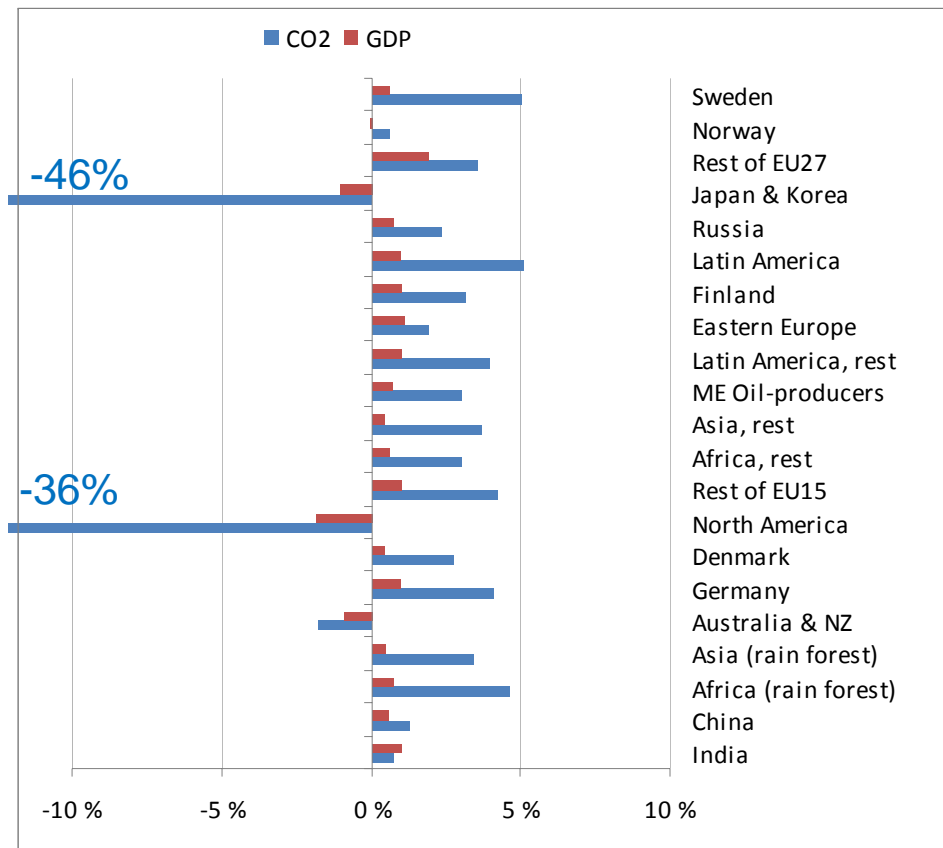
Policy simulations: GDP and CO2 growth

Present commitments, %-difference to no-policy 2020



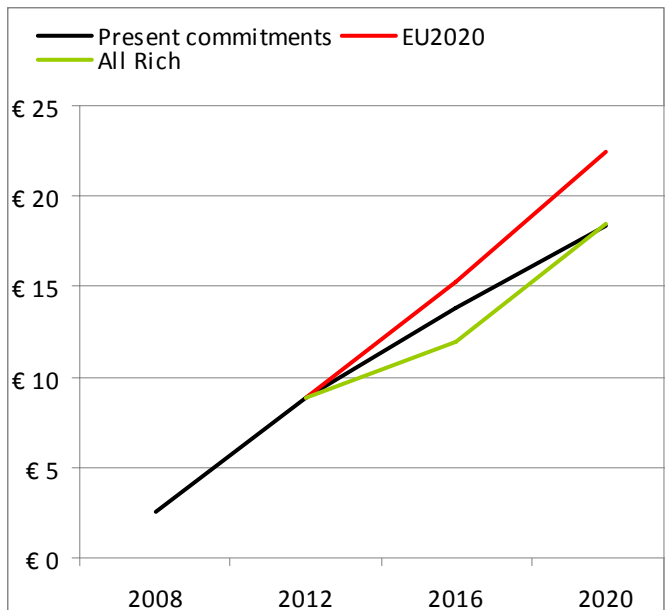
Policy simulations: GDP and CO2 growth

All rich countries reduce, %-difference to present 2020



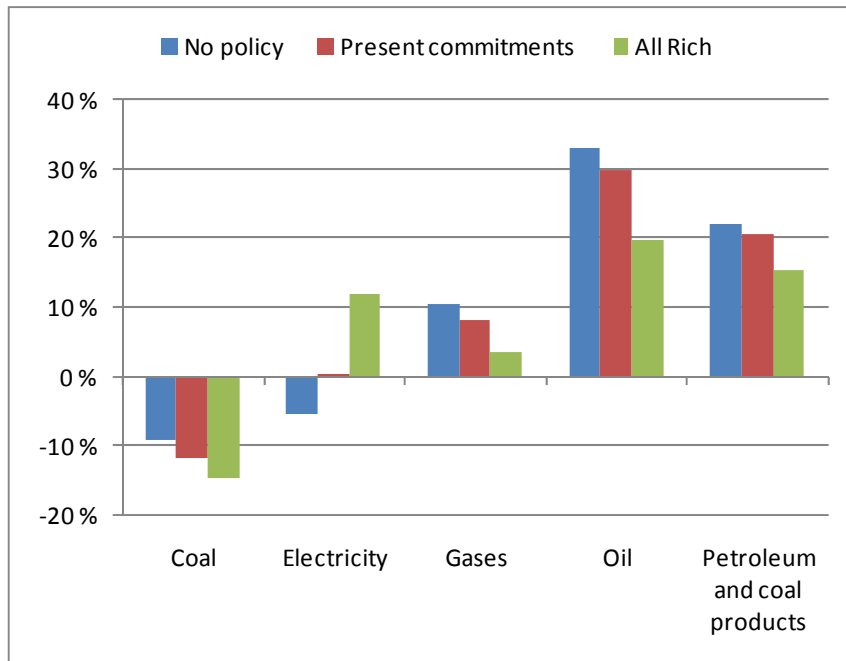
- "Cleaner" technology brings some emissions back to EU
 - Reductions cheaper elsewhere
- Bigger leakage to developing countries
- Small GDP changes with big emissions changes

Policy simulations: CO2 price in emission trading market in '2005 EUR per tonne of CO2



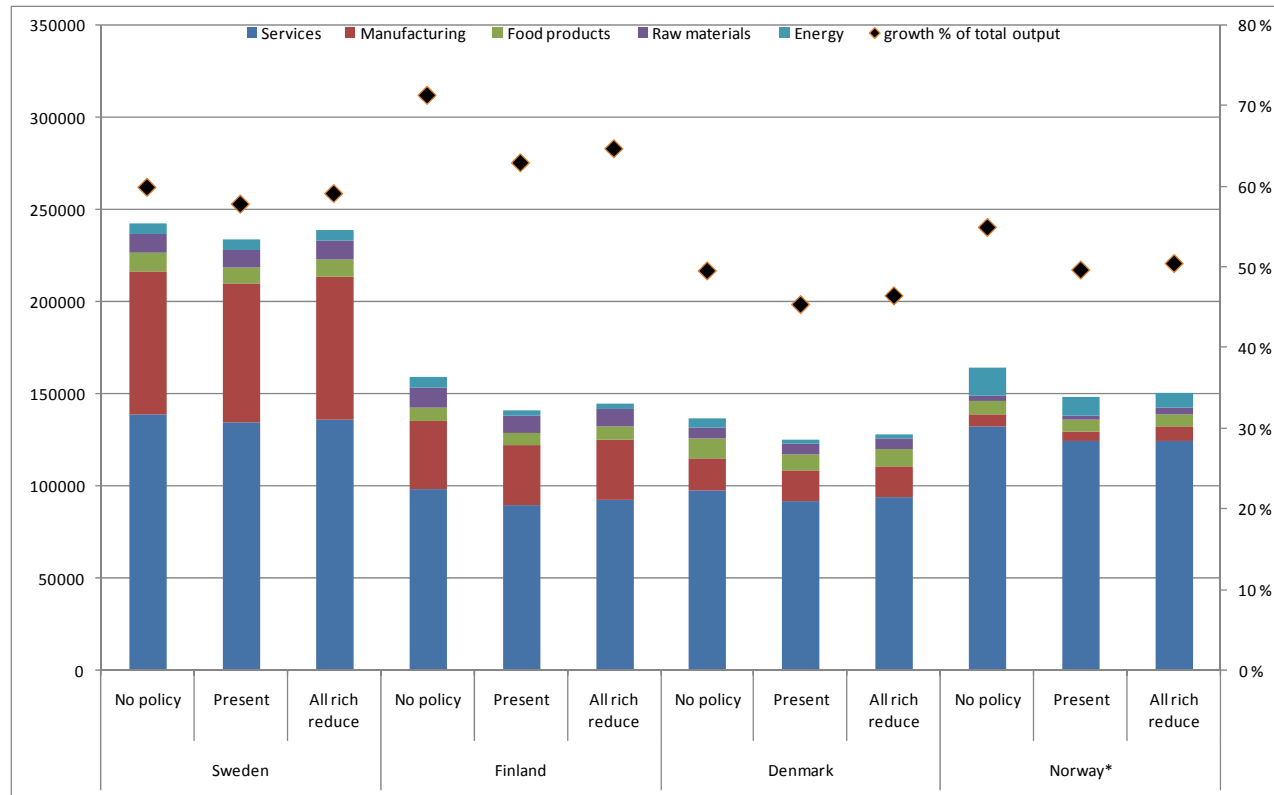
- EU ETS price continues to rise past 2012 without further reductions
- Price effect of new EU-only commitments relatively small
- Expanding the trading area considerably lowers the price, allowing greater reductions

Policy simulations: World energy commodity prices %-change 2001-2020



- Stricter climate policy, lower pre-tax price
- Long-term oil price continues to rise
- Electricity price includes CO2 tax
→ change to opposite direction

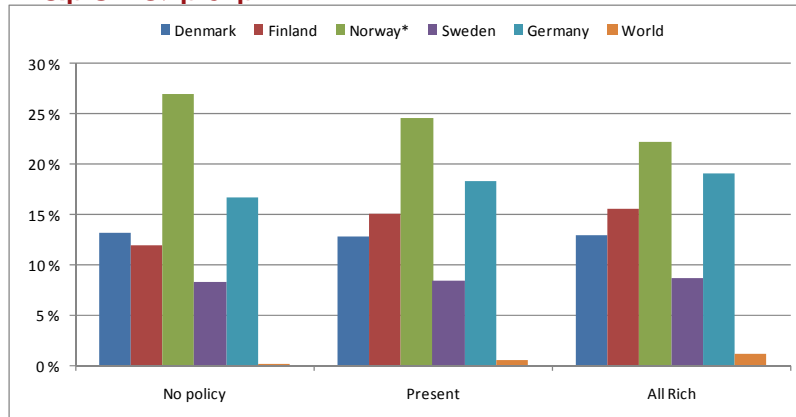
Policy simulations: All industries Nordic Countries, growth 2001-2020



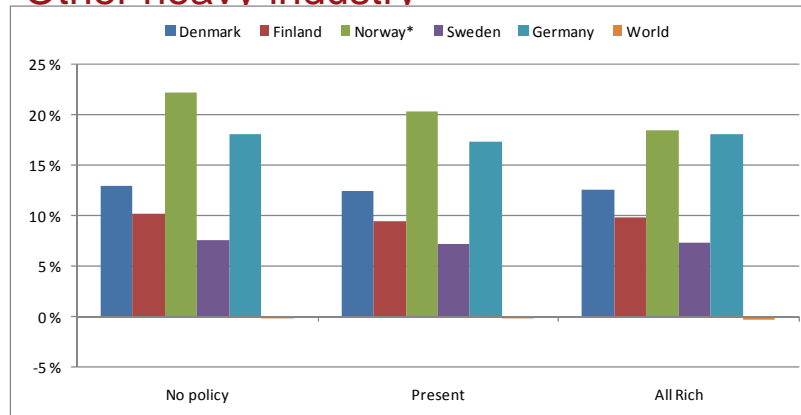
Policy simulations: supply prices in selected industries

%-growth 2020/2001

Paper & pulp

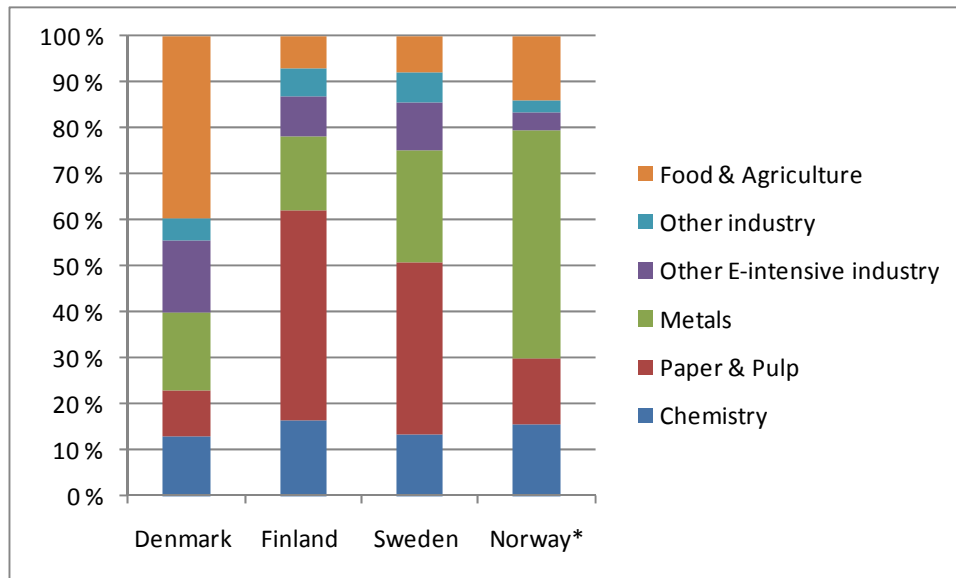


Other heavy industry



- Finland: energy price increase makes especially paper and pulp production relatively more expensive
- Sweden: marginal impact on supply prices → comparative advantage
- Norway: lower oil price → other industries relatively more profitable

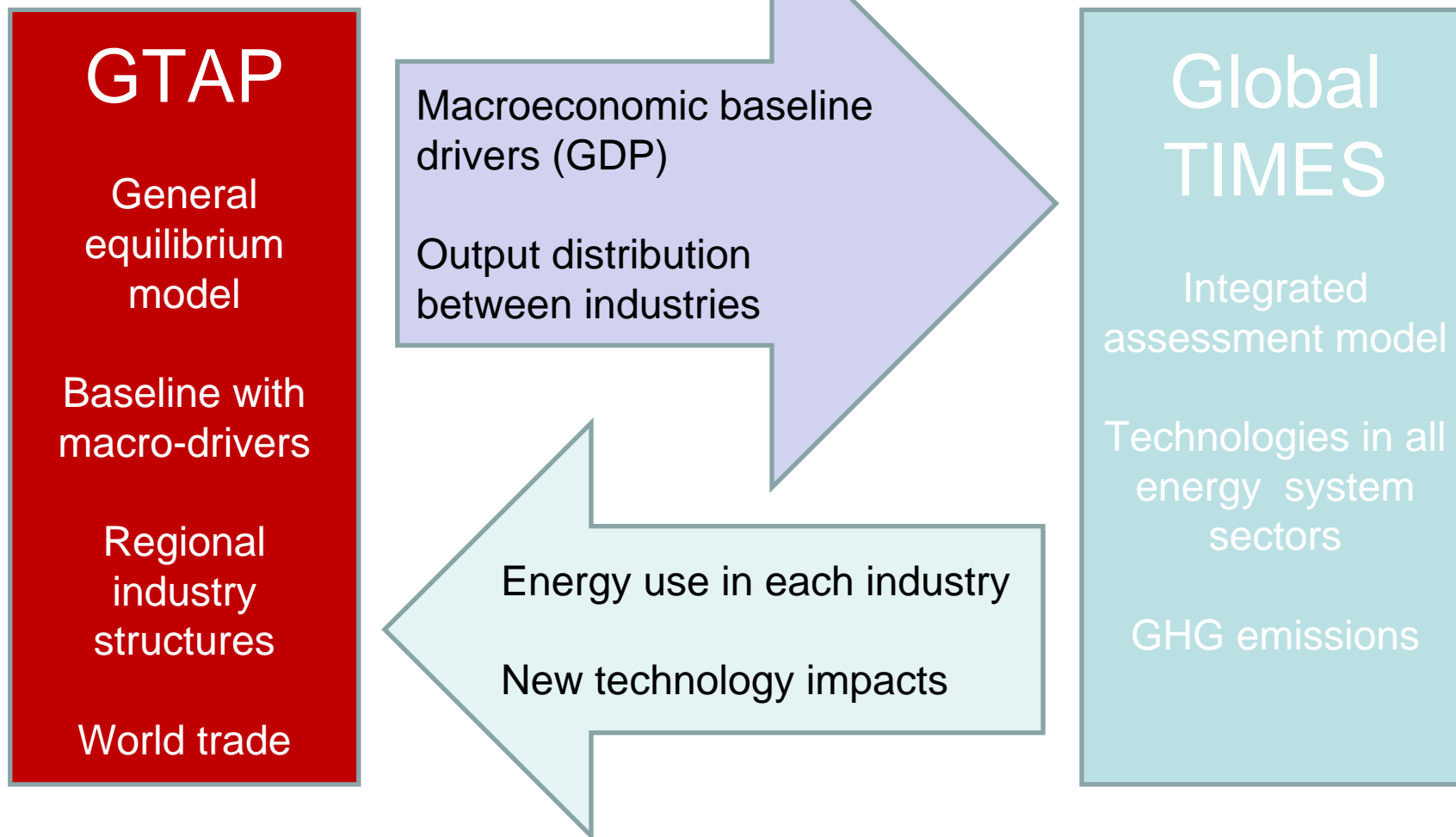
Industry shares of total energy use Nordic countries, excl. services



- Denmark less energy intensive
 - World food price and demand growth impact

- Sweden and Finland: energy-intensive industries affected by final energy prices
 - High energy price leads to reduced industry output

- Norway: Petroleum sector affected by world market oil price
 - High oil price leads to increased oil production
 - Energy use vs. energy production



VATT

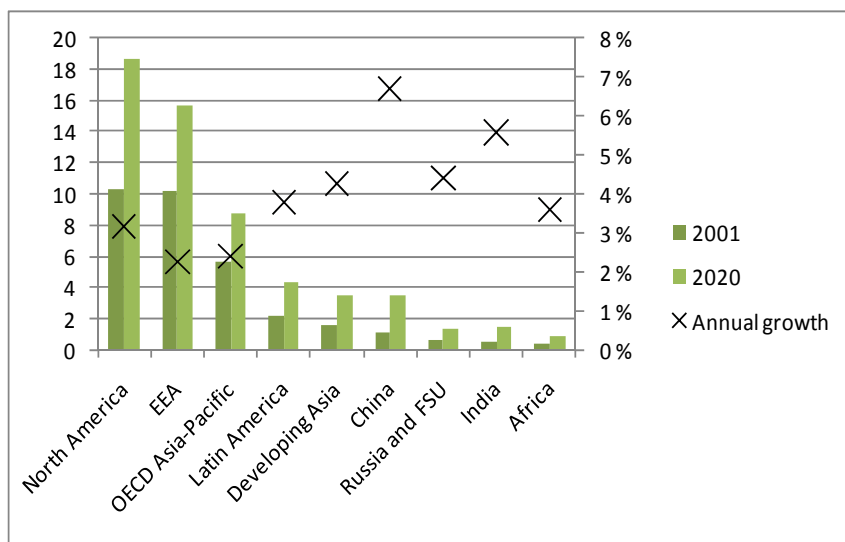
www.vatt.fi

Contents

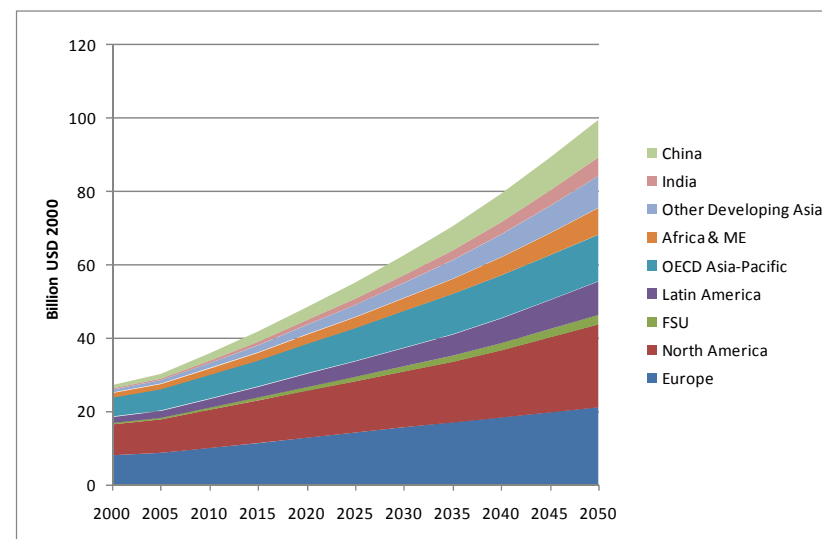
- Scenarios
- Macro-economic baseline and implications without climate policies
- Climate policy impact: global and European level
- Nordic industry prospects in different scenarios

Macroeconomic baseline: GDP

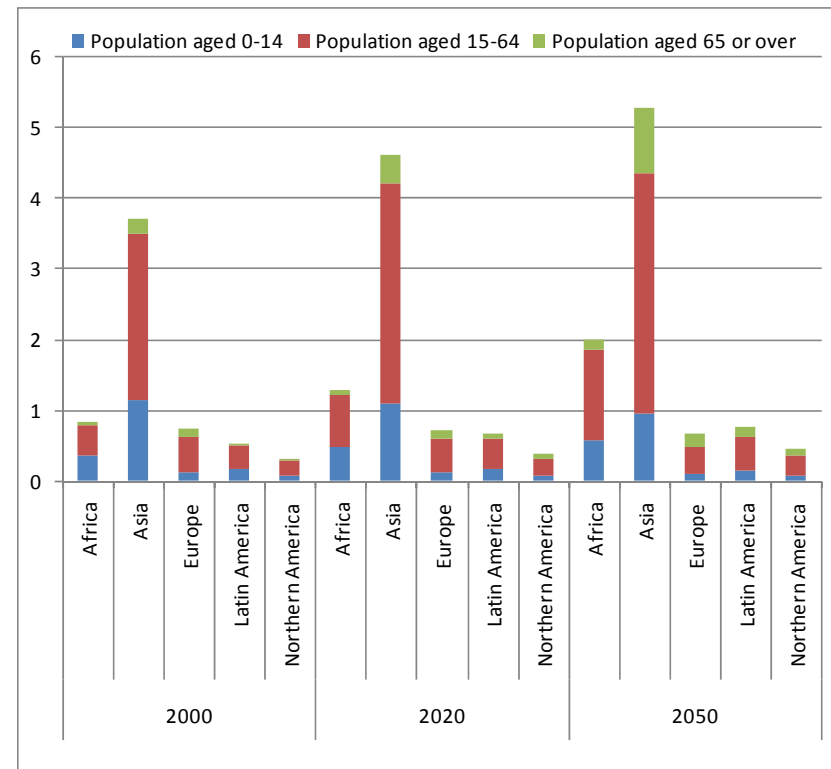
GDP 2020



GDP 2050

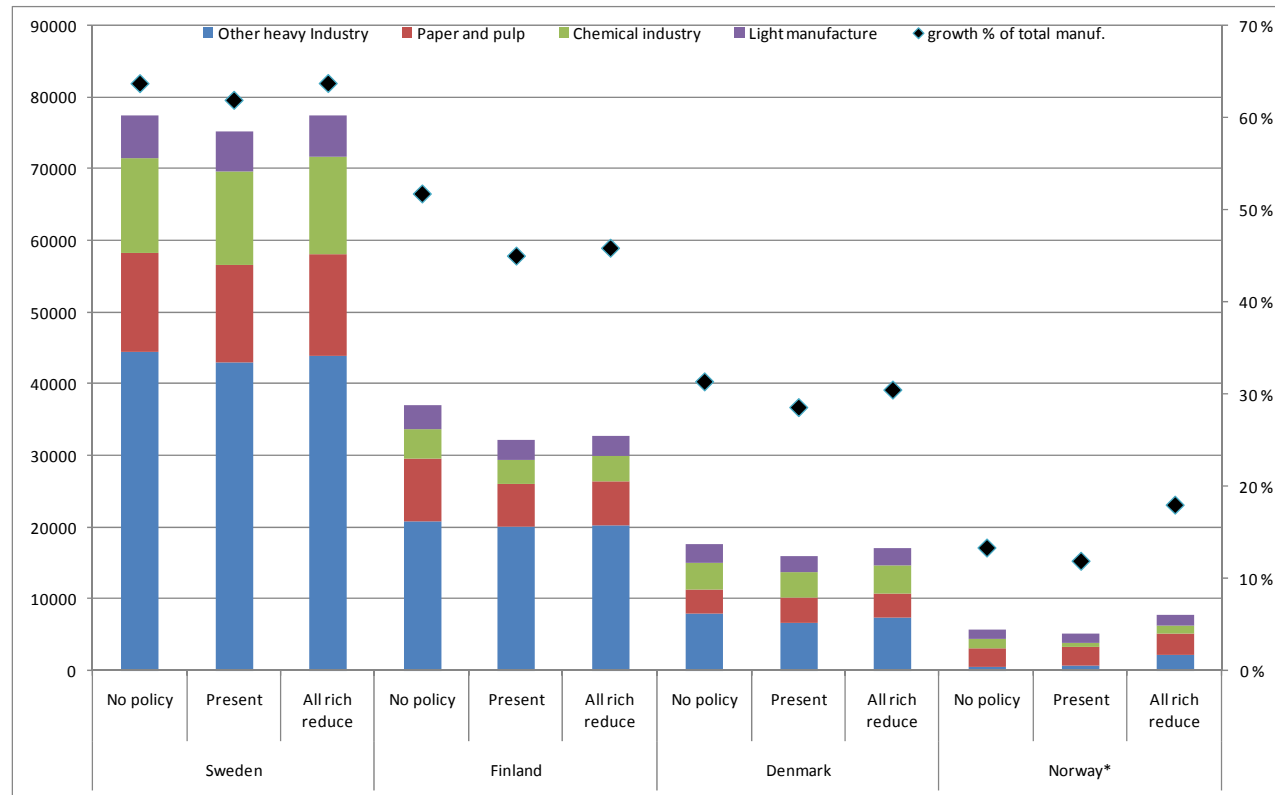


Macroeconomic baseline: Labour and population



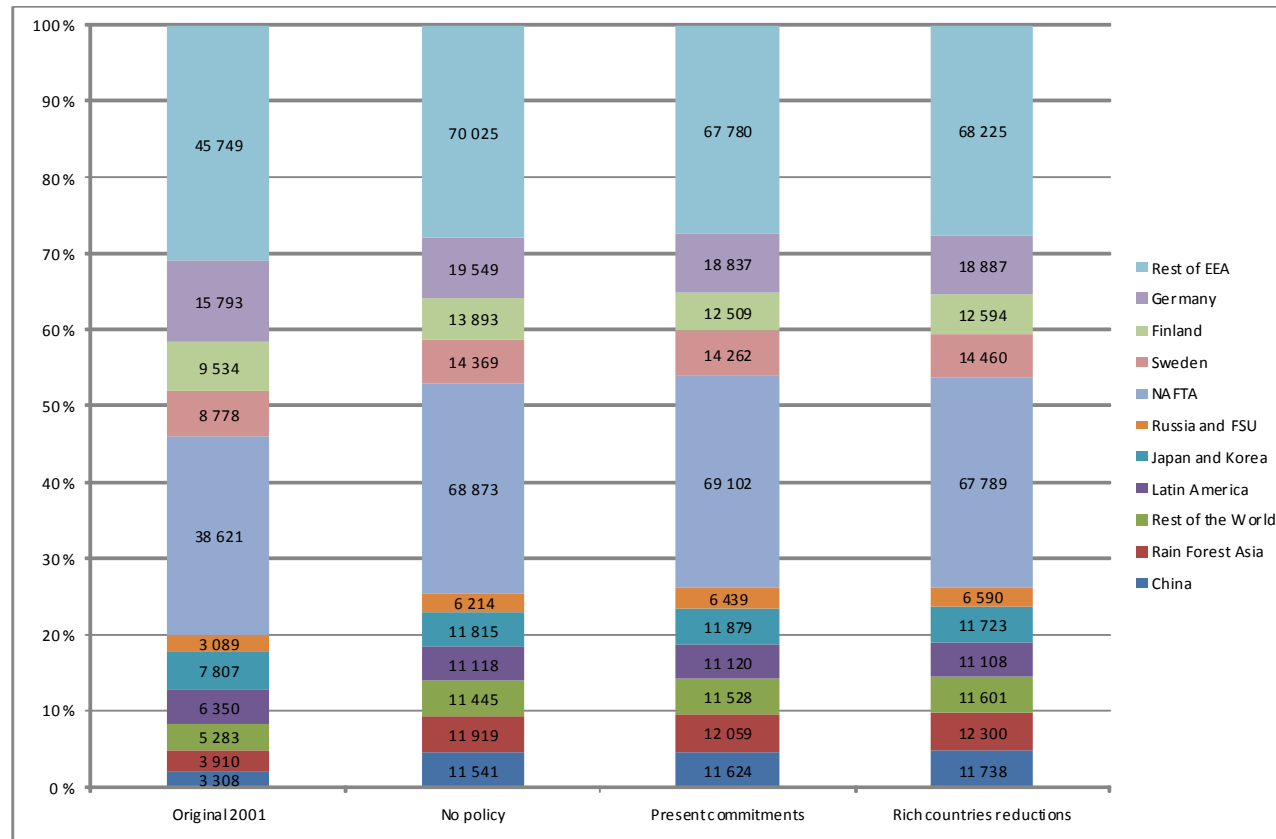
Policy simulations: manufacturing industry

Nordic Countries, growth 2001-2020

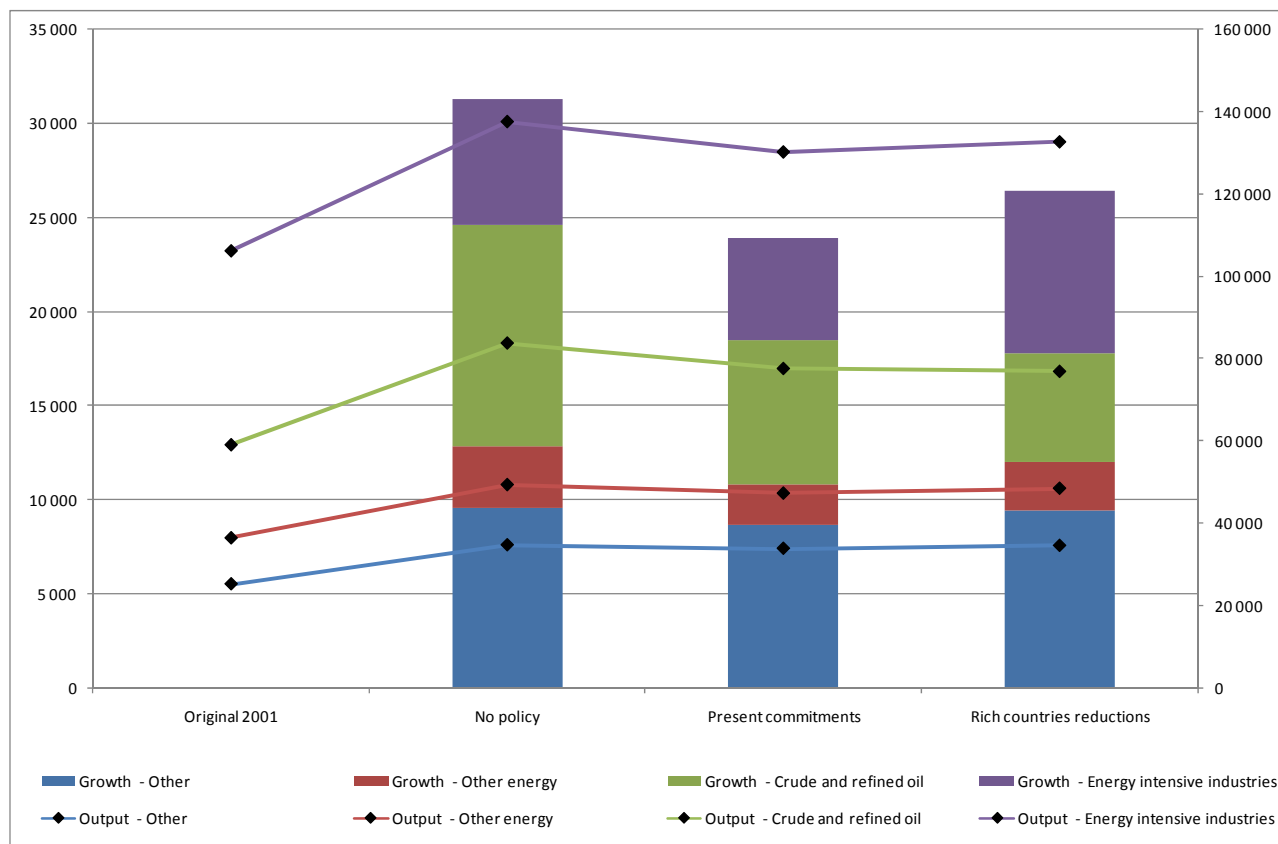


Policy simulations: Paper and Pulp Industry

World total exports

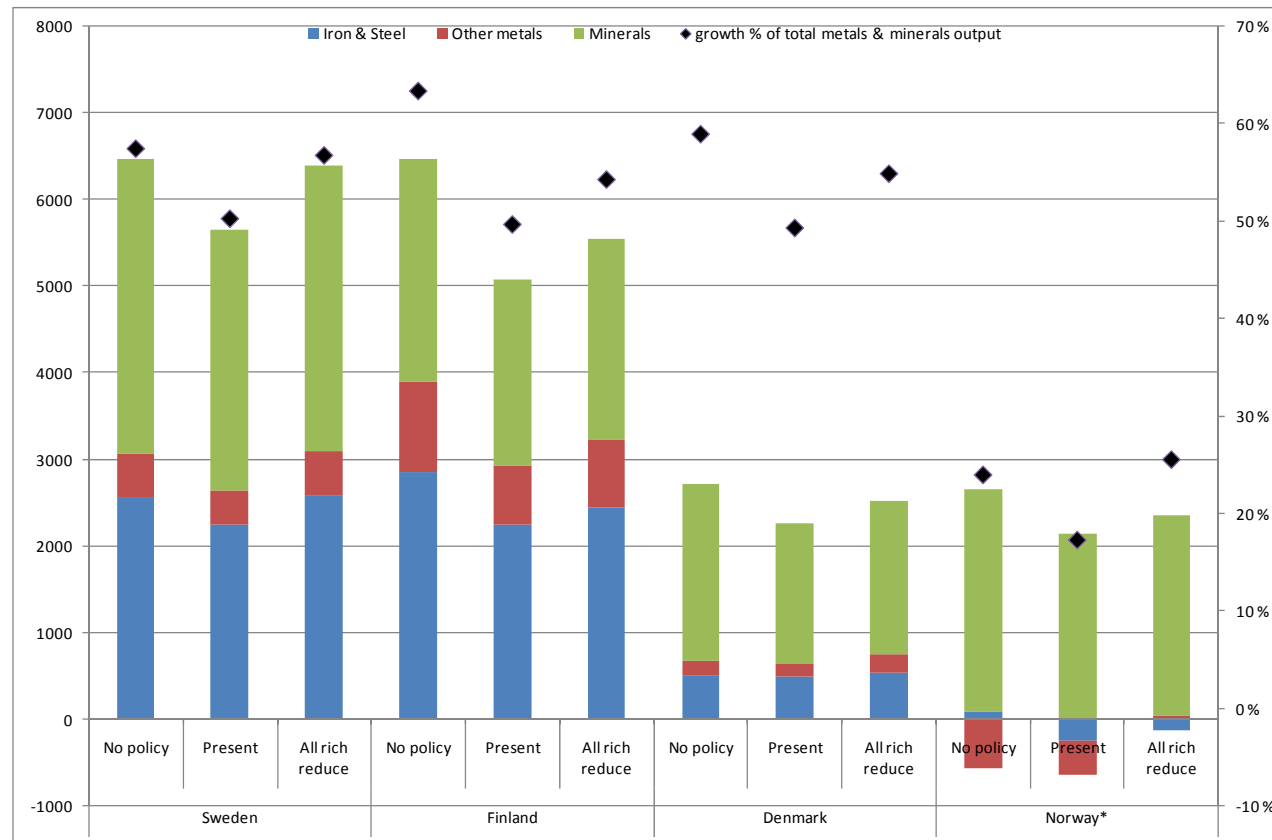


Policy simulations: Norway all industries output growth 2001-2020



Policy simulations: metal and minerals industry

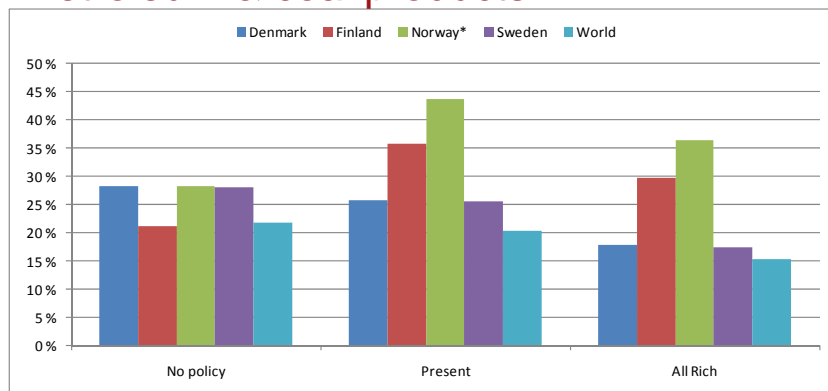
Nordic Countries, growth 2001-2020



Policy simulations: supply prices in selected industries

%-growth 2020/2001

Petroleum & coal products



- Petroleum sector: world market price growth vs. local supply price growth

- Iron & Steel: both market and supply prices increase with emission targets

Iron & Steel

